Remarks

Claims 1-9 and 12-17 are pending in this application. Claims 1-9 and 12-17 stand rejected at this time.

1. **Claims 1, 5-9 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pub. No. 2002/0172195 to Pekkala et al. (hereinafter "Pekkala") in view of U.S. Patent No. 6,145,024 to Maezawa et al. (hereinafter "Maezawa").**

Applicant respectfully traverses the rejection and submits that the references relied upon do not teach or suggest, individually or in combination, what is being claimed in independent claim 1 and all claims dependent thereto. Claims 5-9 and 12 depend from claim 1, and contain all limitations thereof.

The present invention may provide a plurality of input-output (I/O) resources, *e.g.*, Ethernet, SCSI, FC-AL, *etc.*, interface modules, in a multi-server environment, wherein each of the plurality of I/O resources may be allocated to any one of the servers as the operational environment dictates, in a manner that is hardware and software compatible with industry standard I/O subsystems and current software operating systems. Thus the present invention may allocate each of the plurality of I/O resources to selected ones of the servers in the multi-server environment via switches that may behave like multiple I/O bridges. These switches may comprise multiplexers, and input and output buffers, wherein an input buffer and an output buffer pair are coupled to each of the plurality of I/O resources and to each of the servers. The multiplexers provided in the switches are operable to connect the input-output buffer corresponding to a particular server or host to the input-output buffer of one or more desired I/O modules. Consequently, the switches may be statically configured so as to couple the appropriate input-output buffer pairs together (I/O module buffer pair coupled to a respective server buffer pair) such that the desired I/O resources may be operationally coupled to respective

ones of the servers in the multi-server environment. Once the host-to-I/O module physical (dedicated connections) mappings are made by the multiplexers in the switches, each one of the servers may boot up its respective operating system (OS) with the designated and dedicated I/O resources such that the resultant physical topology appears like a conventionally configured I/O system. Specification, paragraph [0028]. No change is required in the server operating system I/O drivers or how each server discovers what I/O assets are coupled thereto.

The Examiner acknowledged the fact that "Pekkala fails to teach the I/O switch statically couples selected ports and fails to teach the plurality of server modules will boot its operating system and recognize the statically coupled ones of the I/O ports." Office Action, at 4-5. The Examiner relies on Maezawa for teaching this limitation.

Maezawa is directed to an input/output data transfer system which is capable of transferring data between channel devices and I/O devices over transmission lines having different transfer capacity bandwidths in a multiplexed or divided data form for improving the utilization rate of transmission lines. Maezawa, Abstract. Specifically, Maezawa discloses a system where "[t]he multiplexer port 9 multiplexes or distributes data transfer frames between one or more switching ports 8 and the link 21 . . . allowing data transfer between plural links 20 and 21 having different transfer capacities." Maezawa, Col. 9, lines 52-58. Consequently, Maezawa simply teaches the use of a data transfer system which allows the transfer of data with different bandwidths on a single data transfer cable thereby reducing the number of input/output data interface cables required for a computer system.

The Examiner relies on Maezawa for teaching that each of the server modules will boot its operating system and recognize the statically coupled ones of the module I/O ports. (Office Action, at 5)(citing Maezawa, paragraph bridging columns 6 and 7). However, Maezawa

is completely silent with regard to this limitation. Instead, the paragraph cited by the Examiner merely states that the "type of channel" device is recognized according to the I/O configuration. Maezawa, Col. 6, lines 65-67. Specifically, "the type of channel device is recognized by making reference to an inherent type code which indicates a physical package type in a physical channel path table." Maezawa, Col. 7, lines 1-5. As a result, the data transfer channel appears to have a uniform bandwidth from the view point of the operating system. Maezawa is completely silent with respect to each of the plurality of server modules booting its operating system and recognizing the statically coupled ones of the module I/O port as recited in independent claim 1.

In contrast, the present invention discloses a system where a plurality of I/O resources may be allocated to any of the servers in a multi-server environment. Specification, paragraph [0008]. Depending on the system requirements, a server may be allocated one or more I/O modules. From the view point of the operating system of the particular server, all the I/O modules allocated to the server appear to be a standard I/O resource for that server. Once the host-to-I/O module physical (dedicated connections) mappings are made, each one of the servers may boot up its respective operating system (OS) with the designated and dedicated I/O resources such that the resultant physical topology appears like a conventionally configured I/O system. Specification, paragraph [0028].

While Maezawa discloses a data transfer system where the data transfer bandwidth appears uniform to the server Operating System, it is completely silent with respect to each server booting its operating system and recognizing the statically coupled ones of the module I/O ports as recited in independent claim 1. Therefore, like Pekkala, Maezawa fails to disclose an I/O switch which statically couples selected ones of the server I/O ports to selected ones of the module I/O ports so that each of the server modules will boot its operating system

and recognize the statically coupled ones of the module I/O ports as recited in independent claim 1.

Pursuant to MPEP § 2143: To establish prima facie obviousness of a claimed invention, all the claim limitations must be thought or suggested by the prior art. *In re Royka*, 490 F.2d 981 (CCPA 1974). As discussed above, Pekkala and Maezawa, alone or in combination, fail to disclose the limitations of independent claim 1. If an independent claim is non-obvious then any claim depending therefrom is non-obvious. MPEP § 2143.03. Claims 5-9 and 12 depend from claim 1, and contain all limitations thereof. Therefore, claims 1, 5-9 and 12 are in condition for allowance and the Applicant respectfully requests a withdrawal of this rejection.

2. Claim 2 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Pekkala in view of Maezawa and further in view of Applicant's alleged Admitted Prior Art (hereinafter "APA").

Applicant respectfully traverses the rejections and submits that the references relied upon do not teach or suggest, individually or in combination, what is being claimed in independent claim 1 and all claims dependent thereto. Claim 2 depends from claim 1, and contains all limitations thereof.

As discussed above, Pekkala and Maezawa, alone or in combination, fail to teach or suggest "statically couples selected ones of the at least one server I/O ports to selected ones of the module I/O ports so that each of the plurality of server modules will boot its operating system and recognize the statically coupled ones of the module I/O ports," as recited in claim 1. Applicant's alleged APA fails to disclose that which Pekkala and Maezawa lack. Therefore, claim 2 is allowable over Pekkala and Maezawa in view of the Applicant's alleged APA.

3. **Claims 3 and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pekkala and Maezawa in view of U.S. Patent No. 6,564,274 to Heath et al. (hereinafter "Heath").**

Applicant respectfully traverses the rejections and submits that the references relied upon do not teach or suggest, individually or in combination, what is being claimed in independent claim 1 and all claims dependent thereto. Claims 3 and 4 depend from claim 1, and contain all limitations thereof.

Heath teaches a host processor and client processors packaged in a single box and connected together over a high speed bus. A standard bus such as PCI may be used. Neither Heath nor the combination of Pekkala and Maezawa, individually or in combination, teach or suggest "statically couples selected ones of the at least one server I/O ports to selected ones of the module I/O ports so that each of the plurality of server modules will boot its operating system and recognize the statically coupled ones of the module I/O ports," as recited in Claim 1. Claims 3 and 4 depend from claim 1 and are allowable for at least the same reason.

4. **Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pekkala in view of Maezawa and further in view of U.S. Patent No. 5,872,904 to McMillen et al. (hereinafter "McMillen").**

Applicant respectfully traverses the rejections and submits that the references relied upon do not teach or suggest, individually or in combination, what is being claimed in independent claim 1 and all claims dependent thereto. Claims 13 and 14 depend from claim 1, and contain all limitations thereof.

McMillen teaches a massively parallel computer system that may automatically reconfigure itself upon detection of a fault. McMillen, Pekkala and Maezawa, individually or in combination, fail to teach or suggest "statically couples selected ones of the at least one server I/O ports to selected ones of the module I/O ports so that each of the plurality of server modules

will boot its operating system and recognize the statically coupled ones of the module I/O ports," as recited in Claim 1. Therefore, claims 13 and 14 are allowable over Pekkala and Maezawa in view of McMillen.

5. **Claims 15 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pekkala and Maezawa, in view of McMillen as applied to claims 13 and 14, and further in view of U.S. Pub. No. 2003/0037224 to Oehler et al. (hereinafter "Oehler").**

Applicant respectfully traverses the rejections and submits that the references relied upon do not teach or suggest, individually or in combination, what is being claimed in independent claim 1 and all claims dependent thereto. Claims 15 and 16 depend from claim 1, and contain all limitations thereof.

Oehler is directed to a computer system with a plurality of resources and a distributed point-to-point infra structure for interconnecting a plurality of processors and a partitioning processor for configuring the plurality of resources into at least on partition. Oehler, Abstract. Oehler, Pekkala, Maezawa and McMillen, individually or in combination, fail to teach or suggest "statically couples selected ones of the at least one server I/O ports to selected ones of the module I/O ports so that each of the plurality of server modules will boot its operating system and recognize the statically coupled ones of the module I/O ports," as recited in claim 1. Claims 15 and 16 depend from claim 1 and are allowable for at least the same reason.

6. **Claim 17 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Pekkala and Maezawa, in view of U.S. Pat. No. 6,826,196 to Lawrence (hereinafter "Lawrence").**

Applicant respectfully traverses the rejections and submits that the references relied upon do not teach or suggest, individually or in combination, what is being claimed in

independent claim 1 and all claims dependent thereto. Claim 17 depends from claim 1 and contains all limitations thereof.

Lawrence teaches establishing virtual circuit connections over data links that may or may not inherently support virtual circuits. The switch taught in Lawrence includes an arrangement of a label switching system (LSS) and one (or more) connection routing and signaling controller(s) (connection controllers). The LSS may include a data-forwarding engine and a label encapsulation unit. A connection control interface provides an interface between the connection controller and the label switching system. The switch allows arbitrary types of connections to be established over arbitrary link types. The arbitrary link types include link types that do not inherently support virtual circuits. Thus, private network-to-network interface (PNNI) routing may be established over Ethernet links.

Lawrence, Pekkala and Maezawa, individually or in combination, fail to teach or suggest "statically couples selected ones of the at least one server I/O ports to selected ones of the module I/O ports so that each of the plurality of server modules will boot its operating system and recognize the statically coupled ones of the module I/O ports," as recited in claim 1. Claim 17 depends from claim 1 and is allowable for at least the same reason.

Applicant respectfully requests reconsideration in light of the remarks contained herein. Applicant respectfully requests withdrawal of all objections and rejections, and that there be an early notice of allowance.

Conclusion

Applicant respectfully submits that the pending claims 1-9 and 12-17 of the present invention, as previously amended, are allowable. Applicant respectfully requests that the rejection of the pending claims be withdrawn and that these claims be passed to issuance.

Respectfully submitted,

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